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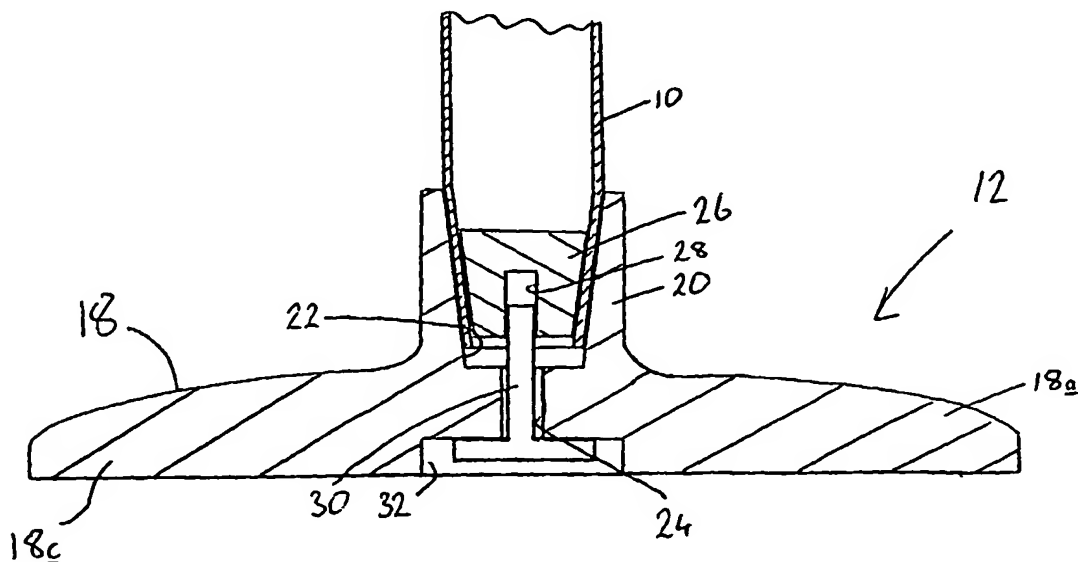
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ning of each regular issue of the PCT Gazette.

(54) Title: MOUNTING OF TUBES



(57) Abstract: A tubular component (10) is secured to another component (12) by locating part of the tubular component (10) within a tapering recess, opening or passage (22), locating a clamping member (26) within the tubular component (10) and securing the clamping member (26) to the said another component (12) to clamp the tubular component (10) between the clamping member (26) and the said another component (12).

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MOUNTING OF TUBES

This invention relates to a technique for use in mounting tubes, and in particular tubes of a material having a degree of ductility, for example a plastics material, or tubes with preformed tapering end sections, to or upon other
5 components.

Plastics tubes are sometimes used to support, for example, the retractable barriers of a queue management system, signposts or a number of other objects. When used in such applications, the plastics tubes are secured, at their lower ends, to appropriately shaped bases. Typically, each base includes an upstanding boss
10 into or over which the associated plastics tube is fitted, the plastics tube then being secured in position using, for example, screws. It has been found that the formation of openings or holes in the wall of the plastics tube into or through which the screws extend introduces stress concentrations which significantly weaken the tube and as a result there is a risk of the tube cracking or breaking, in use. Breakage of the tube
15 in this manner may result in the tube/base combination no longer being suitable for continued use. In some applications, an adhesive may be used instead of screws. However, depending upon the materials of the base and the tube, difficulties may be faced in obtaining an adhesive which is suitable for use with and compatible with both materials.

It is an object of the invention to provide a technique whereby a tube can be secured to another component, for example a base, in which this disadvantage is reduced or overcome.

According to one aspect of the invention there is provided a method of
5 securing a tube to another component, the method comprising providing the said another component with an opening, passage or recess of generally tapering form, introducing the tube into the opening, passage or recess, positioning a clamping member within the tube, and securing the clamping member to the said another component to clamp the tube between the clamping member and the said another
10 component.

The clamping member is also preferably of generally tapering form, conveniently conforming with the opening, passage or recess.

The tube is conveniently of plastics form, and may be of circular cross-section, although other cross-sections may be used, and the said another component
15 is conveniently a base to allow the tube to be stood generally upright and used to support, for example, part of a queue management system, or a housing containing the said part of the queue management system. It will be appreciated, however, that the tube may be used for other purposes, for example as a signpost, part of an exhibition stand or garden furniture.

The tube may be shaped to include an end region of tapering form prior to the introduction of the tube into the opening, passage or recess. However, in one preferred technique, the tube is forced into the opening with a sufficiently high force to deform the end part of the tube to conform, generally, with the tapering shape of the opening, passage or recess.

The clamping member may be provided with a screw threaded passage extending from the lower surface thereof, a screw threaded bolt being used to secure the clamping member to the said another component, the screw threaded bolt extending through an opening formed in the said another component and into the screw threaded passage.

According to another aspect of the invention there is provided a post arrangement comprising a tube, an end of which extends into an opening, passage or recess provided in a base, the opening, passage or recess being of generally tapering form, a clamping member being located at least partly within the tube, the clamping member being secured to the base to clamp the tube between the clamping member and the base.

The tube is preferably of plastics construction, and may be of circular cross-section, but other cross-sectional shapes may be used, if desired.

The clamping member is preferably of generally tapering form, and

preferably conforms generally with the shape of the interior of the part of the tube which is located within the opening, passage or recess provided in the base.

Conveniently, the clamping member is arranged to be secured to the base by means of a screw threaded coupling, for example in the form of a screw threaded
5 bolt arranged to extend through an opening in the base and into a screw threaded passage formed in the clamping member.

The post is conveniently arranged to carry part of a queue management system. It will be appreciated, however, that the post may be employed in a number of other applications, and so may be adapted or arranged to carry a wide range of
10 other components or articles, for example signs.

According to another aspect of the invention there is provided a post arrangement comprising a tube, an end of which extends into an opening, passage or recess provided in a housing forming part of a queue management system, the opening, passage or recess being of generally tapering form, a clamping member
15 being located within the tube, the clamping member being secured to the housing to clamp the tube between the clamping member and the housing.

The tube is preferably of plastics construction, and may be of circular cross-section, although other shapes may be used if desired.

The clamping member is preferably of generally tapering form, and

preferably conforms generally with the shape of the interior of the part of the tube which is located within the opening, passage or recess provided in the housing.

Conveniently, the clamping member is arranged to be secured to the housing by means of a screw threaded coupling, for example in the form of a screw threaded bolt arranged to extend through an opening in the housing and into a screw threaded passage formed in the clamping member.

A post arrangement in accordance with the invention as defined above has the advantage that a generally widespread and uniform attachment means is provided. As no openings must be made in the tube in order to secure the tube to the base or housing, less weakening of the tube occurs than in prior arrangements, thus the risk of the post breaking is reduced. The compatibility problems which may be faced where adhesive is used are also avoided.

The invention will further be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a post arrangement in accordance with an embodiment of the invention;

Figure 2 is a diagrammatic sectional view of part of the post arrangement of Figure 1; and

Figures 3 and 4 are diagrammatic views of alternative configurations.

The post arrangement shown in Figure 1 comprises a plastics tube 10, the lower end of which is secured to a base 12. The upper end of the tube 10 carries, in this embodiment, a unit 14 forming part of a queue management system. The unit 14 comprises a housing 16 within which a spool is rotatably mounted, a length
5 of webbing being wound onto the spool, and a spring being provided to apply a biasing force to the spool so that, if webbing is pulled from the spool, then upon release of the webbing, the spring biasing causes the spool to rotate within the housing 16, winding the webbing back onto the spool and retracting the webbing into the housing 16. As shown, the housing 16 is provided with a slot through which
10 the webbing extends.

The free end of the webbing carries part of a catch mechanism engageable with or connectable to one of three cooperatively shaped receivers formed in or on another similar post arrangement.

A similar unit 14 is also provided part way along the tube 10. Clearly,
15 depending upon the application in which the post arrangement is to be used, this second unit 14 may be omitted, if desired, or additional units 14 may be provided, again if desired.

The base 12 comprises a portion 18 of generally cruciform shape. The portion 18 thus includes four legs 18a, 18b, 18c and 18d. One pair of opposing legs

18a, 18c are relatively long, the other legs 18b, 18b being shorter in length. A boss 20 upstands from the centre of the portion 18, the boss 20 being shaped such that the interior thereof defines a recess 22 of generally tapering form. A passage 24 extends through the portion 18, the passage 24 opening into the recess 22.

5 The tube 10 is located such that its lower end is positioned within the recess 22. During assembly, the lower end of the tube 10 is forced into the recess 22, the engagement between the tube 10 and the boss 20 deforming the lower end of the tube 10 such that it also adopts a generally tapering shape. The action of forcing the tube 10 into the recess 22 may result in the interior of the tube 10 adopting a shape
10 which, although tapering, is not truly conical but rather is slightly barrelled, the inner surfaces of the wall of the tube taking on a slightly concave form.

Within the tube 10 is located a clamping member 26 which is of generally frustoconical form, the cone angle of which is approximately the same as that of the recess 22. Although the clamping member 26 may be of truly frustoconical form,
15 it may be preferable to shape the clamping member 26 to conform generally with the shape adopted by the interior of the part of the tube 10 which is located within the recess 22 and, as mentioned above, it is possible that this may be other than truly conical, for example the clamping member may be of slightly barrelled, generally frustoconical form. A screw threaded bore 28 is provided in the clamping member

26, the bore 28 being aligned with the passage 24. A screw threaded bolt 30 extends through the passage 24 and into the bore 28, the head of the bolt 30 being located within a recess 32 formed in the underside of the base 12. The bolt 30 secures the clamping member 26 to the base 12, clamping the deformed, lower end of the tube 10 between the clamping member 26 and the wall of the boss 20, thereby firmly securing the tube 10 to the base 12.

As the formation of openings in the wall of the tube 10 is avoided, the formation of stress concentrations in the tube 10 is also avoided, and the risk of the tube breaking is thus reduced. The disadvantages associated with using adhesives are also avoided.

The method by which the post described above is assembled comprises forcing the tube 10 into the recess 22 to deform the end thereof, positioning the clamping member 26 within the tube 10 and then securing the clamping member 26 in position using the bolt 30. It will be appreciated that the act of tightening the bolt 30 firmly secures the tube 10 to the base 12. Once the tube 10 has been secured to the base 12, the second unit 14 is secured to the upper end of the tube 10, another length of tube is attached to the second unit 14, and the first mentioned unit 14 is secured in position.

The description hereinbefore is of the manner in which the tube is secured to

the base. The same, or a similar, technique may also be used to mount the units 14 upon the tube 10, the housing of each of the units being shaped to include a generally tapering recess, opening or passage into which the tube 10 is forced, a clamping member located within the tube being secured to the housing of the unit

5 to clamp the tube between the housing of the unit and the clamping member. It will be appreciated, therefore, that in the arrangement of Figure 1, the tube is in two parts, and four connections are made between the end parts of the tubes and the units/base. Obviously, where both ends of the tube are to be deformed, it is important to locate both of the clamping members within the tube before the

10 deformation of the tube is completed.

In the arrangement described hereinbefore, the tube 10 is forced, using a large loading, into the recess 22. It will be appreciated that the magnitude of the load which must be applied may be reduced if, prior to introducing the tube into the recess, one or more slots were cut into the part of the tube to be forced into the

15 recess. However, the formation of such slots may introduce stress concentrations which may weaken the tube.

Figure 3 illustrates a modification to the arrangement described hereinbefore in which the bolt 30 passes through a passage formed in the clamping member 26 and engages with screw-threads formed in a passage provided in the base.

Alternatively, a nut may be provided to co-operate with the screw-thread of the bolt.

In the arrangements described hereinbefore, the tube 10 tapers inwardly.

Figure 4 illustrates an arrangement in which the tube 10 tapers outwardly.

A number of modifications can be made to the described arrangements within
5 the scope of the invention. For example, the clamping member may be of multi-part construction. The tube 10 is preferably of a ductile, conveniently plastics, material allowing it to be deformed to include a tapering region. However this need not be the case and a tube having a preformed tapering region may be used.

Although the invention has been described above in relation to a post for a
10 part of a queue management system, it will be appreciated that the post of the invention may be used in a wide range of other applications, for example for supporting signs or the like, and the method of the invention may also be used in mounting tubes to or upon components other than bases of the type described hereinbefore. Further, a number of changes may be made to the design described
15 above in accordance with the invention. For example, the shapes and relative sizes of the various components may be modified. In other possible arrangements, the tubes may be of cross-sections other than circular.

CLAIMS

1. A method of securing a tube to another component, the method comprising providing the said another component with an opening, passage or recess having a region of generally tapering form, introducing the tube into the opening, passage or
5 recess, positioning a clamping member within the tube, and securing the clamping member to the said another component to clamp the tube between the clamping member and the said another component.
2. A method according to Claim 1, wherein the clamping member is also of generally tapering form.
- 10 3. A method according to Claim 1 or Claim 2, wherein the tube is of a ductile material.
4. A method according to any one of the preceding claims, wherein the tube is of a plastics material.
5. A method according to any one of the preceding claims, wherein the tube is
15 shaped to include an end region of tapering form prior to the introduction of the tube into the opening, passage or recess.
6. A method according to any one of Claims 1 to 4, wherein the action of introducing deforms part of the tube to conform generally, with the tapering shape of the opening, passage or recess.

7. A method according to any of the preceding claims, wherein the clamping member is provided with a screw-threaded passage extending from the lower surface thereof, a screw-threaded bolt being used to secure the clamping member to the said another component, the screw-threaded bolt extending through an opening formed
5 in the said another component and into the screw-threaded passage.
8. A post arrangement comprising a tube, an end of which extends into an opening, passage or recess provided in a base, the opening, passage or recess being of generally tapering form, a clamping member being located at least partly within the tube, the clamping member being secured to the base to clamp the tube between
10 the clamping member and the base.
9. A post arrangement according to Claim 8, wherein the tube is of plastics construction.
10. A post arrangement according to Claim 8 or Claim 9, wherein the clamping member is of generally tapering form.
- 15 11. A post arrangement according to Claim 10, wherein the shape of the clamping member, conforms generally with the shape of the interior of the part of the tube which is located within the opening, passage or recess provided in the base.
12. A post arrangement according to any one of Claims 8 to 11, wherein the clamping member is arranged to be secured to the base by means of a screw-

threaded coupling.

13. A post arrangement according to any of Claims 8 to 12, wherein the post is arranged to carry part of a queue management system.

14. A post arrangement comprising a tube, an end of which extends into an opening, passage or recess provided in a housing forming part of a queue management system, the opening, passage or recess being of generally tapering form, a clamping member being located within the tube, the clamping member being secured to the housing to clamp the tube between the clamping member and the housing.

10 15. A connection arrangement comprising a first component of tubular form, a second component having an opening, passage or recess of tapering form formed therein, and a clamping member, a part of the first component being located within the opening, passage or recess of the second component, the clamping member being located at least partly within the first component and secured to the second component to clamp the first component between the second component and the clamping member.

1 / 2

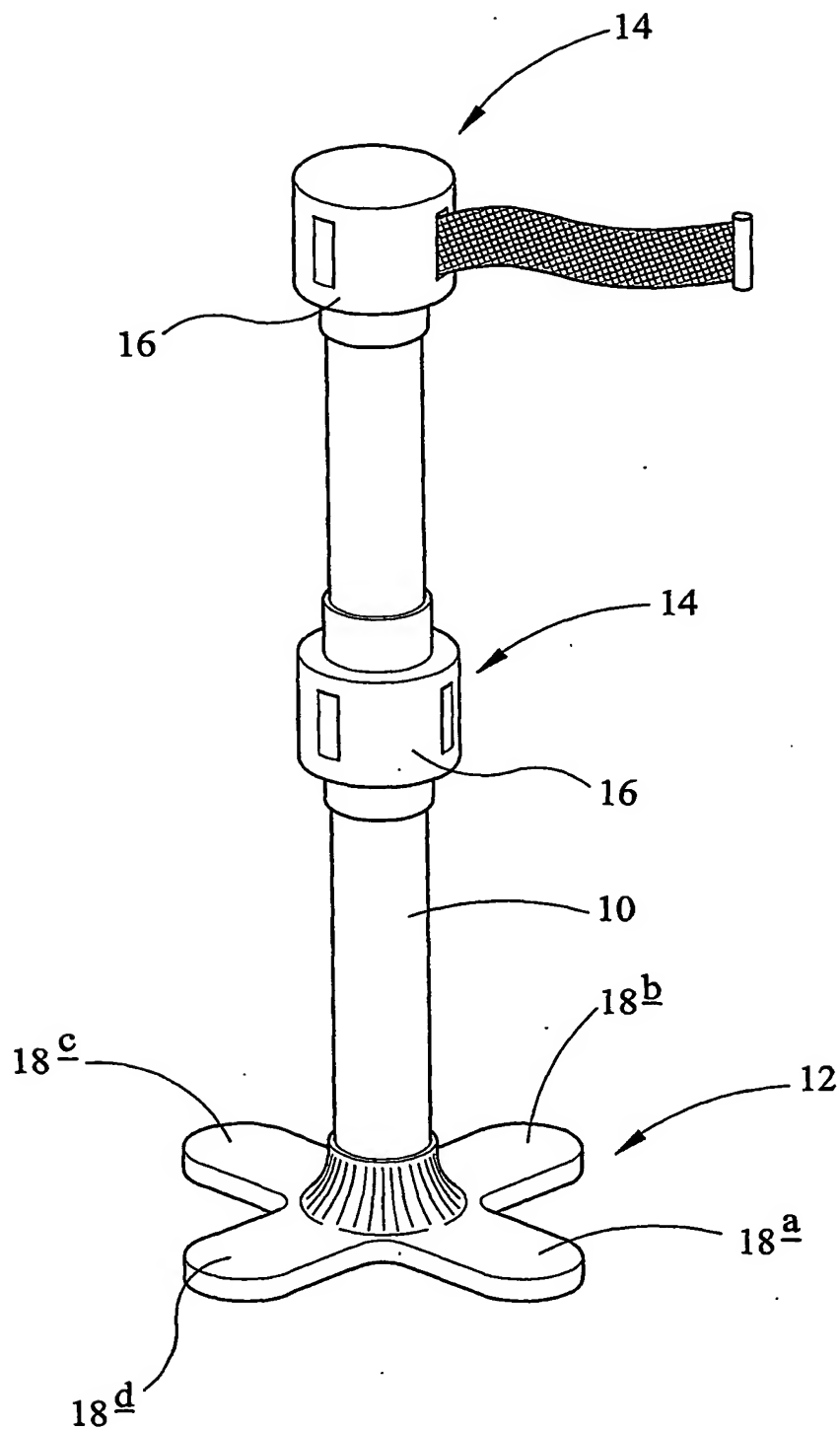


FIG 1

2 / 2

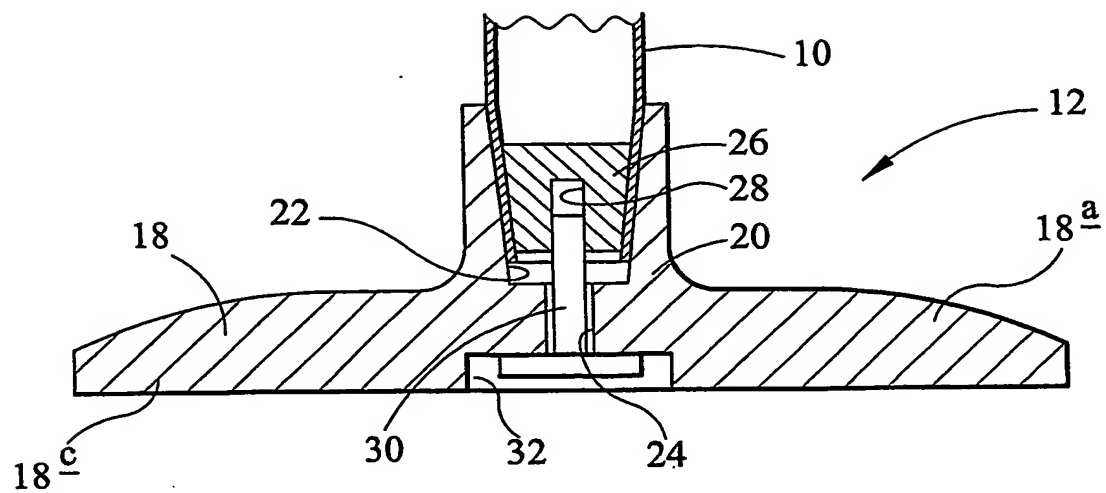


FIG 2

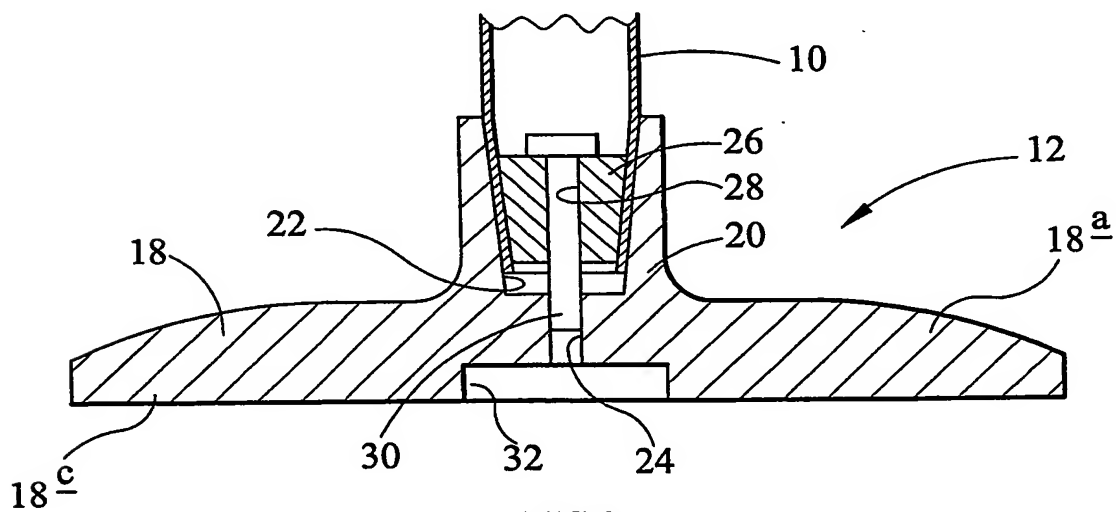


FIG 3

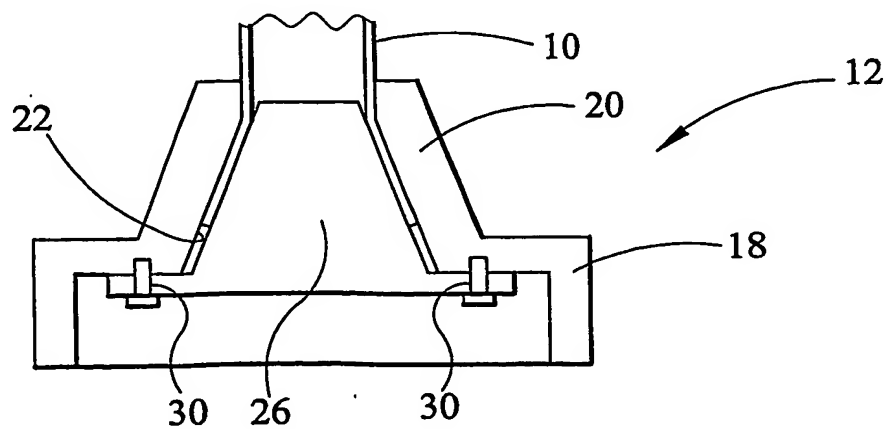


FIG 4

INTERNATIONAL SEARCH REPORT

Application No
PCT/GB 03/03523

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F16B9/02 F16B17/00 E04H12/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F16B E04H A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3 081 114 A (ESTY HOWARD E) 12 March 1963 (1963-03-12) claim 1; figures 5-8	1-15
Y	DE 72 22 934 U (BILGERY K.) 21 September 1972 (1972-09-21) the whole document	1-15
A	DE 40 30 978 A (WILKE HEINRICH HEWI GMBH) 9 April 1992 (1992-04-09) abstract; claim 1; figure 11	1-12,15
A	US 3 633 862 A (BREEN WILLIAM ROSS) 11 January 1972 (1972-01-11) abstract; figures 2,7	1-12,15

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Patent Application No
PCT/GB 03/03523

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3081114	A	12-03-1963	NONE	
DE 7222934	U	21-09-1972	NONE	
DE 4030978	A	09-04-1992	DD 299201 A5	02-04-1992
			AT 108520 T	15-07-1994
			DE 4030978 A1	09-04-1992
			DE 59102168 D1	18-08-1994
			EP 0477707 A1	01-04-1992
US 3633862	A	11-01-1972	NONE	